

REMARKS

This Amendment is in reply to a final Office Action mailed May 27, 2009. Claims 1, 3-9, 11-16, and 19-24 are pending in the application, with claims 4-8 and 12-16 withdrawn from consideration. Claims 1, 9, and 19-24 stand rejected under 35 U.S.C. §103(a). Claims 1, 9, and 19-24 also stand rejected under 35 U.S.C. §112, first paragraph. In response, Applicants have cancelled claims 1, 3, 9, 11 and 19-24 without prejudice or disclaimer and present new claims 25-32 for consideration. No new material has been added by way of these amendments. A Request for Continued Examination is filed herewith. The Commissioner is hereby authorized to charge deposit account 02-1818 for any fees which are due and owing.

In the Office Action, claims 1, 9, and 19-24 are rejected under §112, first paragraph, for lack of enablement, based on independent claims 1 and 9. This rejection is moot in view of the amended claims.

In the Office Action, claims 19 and 22 are further rejected under §112, first paragraph, for lack of enablement. The Patent Office has asserted that the specification does enable “a SBR to PAA of mass ratio of 2:2.5 or 0.8:1 or SBR to PAA of 2:2.5 or 4:1,” but that it does not enable a range of SBR to PAA of 0.8:1 to 4:1. The Patent Office further explains that the specification does not illustrate points such as 0.9:1, 1.1:1, 1.2:1, etc and therefore does not provide reasonable enablement for the range covering those ratios. While claims 19 and 22 have been cancelled and the rejection is effectively moot, a similar limitation appears in new claims 26 and 30, so Applicants will further clarify this issue.

The standard for enablement is simply that the specification describe how to make and how to use the invention without undue experimentation. The claim limitation, as set forth in claims 26 and 30, is a simple ratio of binder SBR to thickener PAA. The specific support to the ratios were presented in Tables 1 and 2. One of ordinary skill can look at those values and very simply modify the amount of SBR or PAA to get a slightly different ratio that falls within the claimed range. This is a simple calculation and certainly cannot qualify as undue experimentation.

Moreover, both independent claims and corresponding sections of the specification contain ranges of SBR from 2 wt% to 4 wt% and PAA of 0.5 wt% to 2.5 wt%. One of ordinary skill in the art would recognize that a range of weight ratios of SBR to PAA can easily be

extracted from these two ranges. For example, SBR at 4 wt % (the high end of the range) with PAA at 0.5 wt% (the low end of the range) gives an SBR to PAA ratio of 8:1. Conversely, SBR at 2 wt% (the low end) with 2.5 wt % PAA (high end) gives a ratio of 0.8:1. Therefore, base independent claims 25 and 29 and similar disclosures within the specification also inherently describe a range of weight ratios for SBR to PAA from 0.8 to 8:1. The dependent claims then represent narrower claims of a range set forth within the specification, and are drawn to the specific ranges set forth in the examples. The assertion that a ratio of 0.8:1 does not somehow enable 0.9:1 when no undue experimentation is required to reach the value and the range is already encompassed within the base claim is improper. Applicants respectfully request it be withdrawn.

In the Office Action, claims 1, 9 and 19-24 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent 6,632,566 (hereinafter "Yamada") and U.S. Patent 5,631,100 (hereinafter "Yoshino.") As has been covered previously, the Patent Office alleges that Yoshino generally provides for the binder and thickener and that Yamada generally provides for the LiFePO_4 having an olivine structure. These rejections are now moot in view of claims 25-31. Specifically, the new claims are drawn to a narrower embodiment present within the specification and specifically within the examples, wherein the cathode active material is a lithium iron phosphorous oxide containing carbon. Support for this limitation can be found on page 7, last paragraph, of the filed specification ("preferably contained within the cathode active material") and in the Examples on page 13, second and third paragraphs. In contrast, neither Yoshino nor Yamada teach or suggest a lithium iron phosphorous oxide with the carbon contained within it. Yamada's only teaching is to a LiFePO_4 as the cathode active material, the carbon being added to form the cathode paste. Yoshino's only teaching is to Li-Co composite oxide with carbon added to form the cathode paste. Neither reference teaches the carbon contained in the LiFePO_4 . For this reason, the claimed invention is non-obvious over the cited references.

In view of these amendments and the clarification of the SBR:PAA ratio, Applicants assert that the claims are now in condition for allowance and respectfully request consideration of the same.

Applicants would like to clarify one additional point of confusion for the Patent Office. As discussed in previous responses, Applicants assert that the disclosure of binder and thickener in Yoshino does not teach or suggest the values claimed by the Applicants. The rule from the MPEP covering obviousness of ranges is particularly applicable here. A prior art reference that discloses a range encompassing a somewhat narrower claimed range is sufficient for prima facie obviousness rejection, but if **a reference's disclosed range is so broad as to encompass a very large number of distinct compositions**, the narrower range may be patentable over the broader range. MPEP §§2144.05, 2144.08.

This rule is specifically applicable to the claimed invention. In this instance, independent claims 25 and 29 require 2-4 wt% binder and 0.5-2% weight thickener. Yoshino does not make obvious these ranges. A table setting forth a comparison of the claimed ranges and Yoshino's disclosure is presented below:

	Claimed invention in claimed units	Claimed invention in Yoshino's units	Yoshino's disclosure
Binder	2 wt% to 4 wt % of cathode mixture	Approx. 2 to 4 pbw versus electrode active material	0.1-20 pbw of electrode active material
Thickener	0.5 wt% to 2.5 wt % of cathode mixture	Claims 25 and 29: 12.5-125 pbw v. binder Claims 26 and 30: 25-125 pbw v. binder	2-60 pbw per 100 pbw binder
Carbon material	5-12 wt% contained in LiFePO ₄		Single example 4.7%

Because Yoshino reports the amounts of binder and thickener in different units, Applicants have provided conversions of the units used in the claims to units used in Yoshino. These conversions have been demonstrated in several prior responses. See, for example, Applicants Pre-Appeal Brief Request, filed May 2, 2008, page 3; Applicants Response to Office Action, mailed August 4, 2008, pages 7-9. Yoshino only discloses the range of 2-60 pbw thickener per 100 pbw binder. In contrast, the claimed ranges, in the units used in Yoshino, of

thickener is 12.5 - 125 part by weight PAA per 100 parts by weight SBR, with dependent claims giving 25 – 125 pbw PAA per 100 pbw SBR.

The Patent Office appears to have misunderstood this point. In the most recent Office Action, the Patent Office states that

“Applicants appear to have values disclosed by Yoshino to be 12.5-125 pbw thickener per 100 pbw binder, the Examiner is confused as how these values were calculated because the Yoshino reference discloses that the thickener can have 2-60 pbw of 100 pbw SBR, *indicating that the thickener must be less than SBR*, even at the highest value of thickener being 60 pbw SBR, it indicates **that the thickener cannot be more than the binder.**”

Office Action mailed May 27, 2009, page 8 line 20 to page 9 line 3 (emphasis added.)

Applicants respectfully submit that this is exactly the issue. The claimed invention reaches well above the limitations of Yoshino. Applicants have demonstrated that, with SBR and PAA using LiFePO₄ containing carbon at 5-12 weight%, the required amount of binder is small, and the amount of thickener can equal and even exceed the amount of binder. Example 2-2 is a prime example, having more thickener than binder.

Moreover, as previously noted, numerous compositions slightly outside of the claimed invention, but well within the disclosure of Yoshino, simply do not work. Compositions containing 99:1:1, 99:5:1, and 97.7:2:0.3 catalyst:binder:thickener fail, while compositions 98:2:1, 96:4:1, 97.5:2:0.5, and 95.5:2:2.5 succeed.

In summary, the combination of Yoshino and Yamada does not teach or suggest a LiFePO_4 containing carbon and fails to predict the narrow range of SBR and PAA necessary to prepare cathodes of effective compositions. For these reasons, independent claims 25 and 29 are non-obvious in view of the combination of Yoshino with Yamada. Furthermore, Applicants respectfully assert that dependent claims 26-28 and 30-32, drawn to specifically disclosed experimental embodiments of the claimed invention, are further distinct and non-obvious over the Yoshino. For these reasons, Applicants assert that claimed invention is novel and nonobvious, and respectfully request that the rejections be withdrawn.

Respectfully submitted,

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